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SYDNEY COAL

January 10th, 1871.

Gentlemen,—

I beg to report to you on the examination I have just completed for the General Mining Association of London, according to directions from R. H. Brown, Esq., Manager at the Sydney Mines, Cape Breton.

The sample of Coal forwarded to me, last month, was in two boxes, each 8 inches square by 3 feet long, which contained a full section of the Main Seam 6 feet high, half the length being in each box. Pieces were taken throughout, so that a fair average of the quality of the whole seam might be procured. The Coal arrived in excellent condition after a long sea voyage and about 50 miles of land carriage, of which 45 were by rail. I obtained the following results on analysis:—

COMPOSITIVE OF AVERAGE SAMPLES OF THE WHOLE SEAM OF COAL.

By Medium Coking.	
Moisture	3.04
Volatile combustible matter	31.14
Fixed carbon	61.50
Ash (reddish brown)	4.32
	100.00
Coke per cent	65.82
Theoretical evaporative power.	8.45 lb.

By Fast Coking.	
Total volatile matters	37.48
Coke	62.52
	100.00
Theoretical evaporative power.	7.98 lb.

By Slow Coking.	
Total volatile matters	29.70
Coke	70.30
	100.00
Theoretical evaporative power.	9.06 lb.

Mean coke per cent	66.21
Mean theoretical evaporative power	8.49 lb.
Ash per cent	4.32
Sulphur per cent	1.24
Specific Gravity of average samples	1.30
Calculated weight of one cubic foot, unbroken	81.10 lb.
" " " " broken	54.50 lb.
Space for one ton, 2240 lb., on stowage ("Economic Stowage")	41.10 cubic feet

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Sand a...	
Peroxide o...	
Alumina	
Sulphate of lime.....	3.05
Lime	0.23
Magnesia.....	
Phosphoric acid, decided traces.....	
Manganese, traces.....	
Chlorine, traces.....	
	100 00

GAS RETURNS,

By G. Buist, Esq., Manager of Halifax Gas Works,

(On samples furnished by me.)

Gas (average of 4 tests) per ton of 2240 lb. .....8200 cubic feet.
Coke " " " " .....1295 lb., of good quality.
Illuminating power of gas (average of 6 tests).....8 candles.

The details above given explain the well known high favour in which this Coal has been held for upwards of forty years for domestic use, and also for steam producing by those who have employed it carefully.

The amount of ash is 1.29 per cent less than was found by Johnson in the American Navy Trials in 1842–3, so that there is some gain in this important respect. The percentage of volatile combustible matter in my analysis is greater than that given by Johnson, being 31.14 against 23.81, but as he makes no mention of the rate of coking it is impossible to compare closely on this point; it would seem, however, not only from these results, but on comparing the statement by Dawson in 1855, "that the Sydney Coal yields less gas than Picton Coal," and the present yield of gas by Picton Coals, given in the Report of the Geological Survey for 1870, with that of the Sydney Coal in this report, that this last has become of a somewhat more gas-producing nature since the date of former examinations. Thus, the average of five trials of the G. M. Association's Albion Mines Coal is stated at 7400 cubic feet per ton, and of the whole 11 trials of these and other Picton Coals at 6955 c. ft., the highest yield, 8000 ft being from the "Foord" Pit coal, while Mr. Buist finds for the Sydney an average of 8200 c. ft. per ton. The low illuminating power of this gas, however, and the presence of a larger quantity of sulphur

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of course be against

...ve power, or number of pounds of water which should be evaporated by one pound of coal, 8.49, compares very favourably with the actual power of British Coals, as found in the Navy Trials in which I assisted; these were:—

Average of	37	samples	from	Wales.....9.05 lb.
"	17	"	"	Newcastle.....8.37 lb.
"	28	"	"	Lancashire.....7.94 lb.
"	8	"	"	Scotland.....7.70 lb.
"	8	"	"	Derbyshire.....7.58 lb.

This fact alone would always have been significant as indicating that the Sydney Coal should prove a good steam-coal, but, since late experiments have shewn that, when burnt in proper furnaces the bituminous coals have been found to give no smoke, and to have an evaporative power even superior to that of Welsh steam-coals, it is now of the highest importance. It is necessary to draw attention in this connection to the resemblance of the Sydney Coal to those bituminous coals which gave these results, in containing a low percentage of ash. It is stated in the late Geo. Survey Report on Pictou Coals that "the very high results in evaporative power obtained from the N. of England coals are scarcely possible with the Pictou coals, as these almost invariably contain more ash than those from the north of England." Now, I find that the average percentage of ash from 22 analyses by myself and others of good Pictou coals from various mines is 7.84, from 14 analyses of N. of England coals it is 3.77, while Sydney Coal gave me only a little more than this, viz., 4.32. It is a proof of its steam producing power being good that, as I mentioned in my report to the Provincial Government on the Mineralogy of N. S., 1868, the Director of Naval Construction at Brest reported to the French Minister of Marine (about 1860,) "that the steam power of Sydney Coal is little inferior to that of Cardiff and equals that of Newcastle Coal."

With respect to the amount of sulphur, I find that after deducting the harmless sulphur in the sulphate of lime of the ash, there remains but 1.24, per cent, or less than the average in 37 Welsh and 28

Lancashire coals, v
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purposes. The sulphur perhaps appears larger in quantity in Sydney Coal than it really is, because in some parts very thin scales of pyrites are spread out over surfaces so as to strike the eye, whereas in many coals the pyrites is mainly in streaks and bands, of notable thickness occasionally, but often so thin as to pass with little observation, or so diffused through the coal as scarcely to be noticed.

The economic weight or space occupied on stowage is good.

The ash has about the average composition of that of bituminous coals.

I conclude that the Sydney Coal fully merits the very high esteem in which it has been so long held for domestic use; I am inclined to think its sulphur has been over-rated by repute, and I hope I have made it appear that it deserves to be considered a good Steam Coal.

I am, Gentlemen,

Your obedient servant,

(Signed) HENRY HOW,

Professor of Chemistry.

To Messrs. Cunard and Morrow,

Agents to the General Mining Association,

Halifax.

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